Title: Crazy About Candy Bars

Link to Outcomes:

- **Problem Solving** Students will demonstrate their ability to solve problems including problems with open-ended answers, problems which are solved in a cooperative atmosphere, and problems which are solved with the use of technology (calculators, computers).

- **Communication** Students will demonstrate their ability to communicate mathematically. They will read, write, and discuss mathematics with language and the symbols and terms of the discipline.

- **Reasoning** Students will be able to demonstrate their ability to reason mathematically. They will make conjectures, gather evidence, and build arguments.

- **Connections** Students will be able to connect statistics to topics within the discipline of mathematics and within the disciplines of health and language arts.

- **Estimation & Computation** Students will demonstrate their ability to apply estimation strategies in computation with the use of calculators, in measurement, and in problem solving. They will determine reasonableness of solutions.

- **Technology** Students will demonstrate their ability to solve problems using arithmetic operations with calculators where appropriate.

- **Number Sense & Operations** Students will demonstrate their ability to describe and apply number relationships using concrete and abstract materials. They will choose appropriate operations and describe effects of operations on numbers.

- **Geometry & Spatial Sense** Students will demonstrate their ability to describe and apply geometric relationships using three-dimensional objects.

- **Measurement** Students will demonstrate and apply concepts of measurement using standard metric units. They will estimate and verify measurements. They will apply measurements to interdisciplinary and real-world problem-solving situations.

- **Statistics** Students will demonstrate their ability to collect, organize, display, and interpret data. They will write reports based on statistical information.

- **Mathematical Disposition** Students will demonstrate a positive attitude toward mathematics and will value and appreciate the role of mathematics in school and society.

Brief Overview:

Candy is an appealing topic for students of all ages. In this activity, fourth and fifth-grade students gather information on various candy bars by reading nutrition fact labels, measuring with metric rulers, computing volume, and calculating the cost per gram. Once collected, this data is organized and displayed in student-constructed glyphs which are then interpreted. This activity can be extended to provide the teacher an opportunity to teach the concepts of measurement, decimals, computation, and statistics. If these concepts have been previously taught, this activity provides an excellent opportunity to review and apply them.

Grade/Level:

Grades 5 and 6

Duration/Length:

This activity will take three days. Time may vary due to student ability levels and the extensions used.

Prerequisite Knowledge:

- Students should have a basic understanding of glyphs and how to construct and interpret them.
- Students should have knowledge and experience in measuring objects using grams and centimeters.
- Students should understand the concept of volume.
- Students should have previous experience in using equations.
- Students should be able to understand, read, and estimate decimals.
- Note: These prerequisites apply only if this unit is used as a review and application lesson.

Objectives:

- Collect, organize, and display data using glyphs.
- Interpret student-constructed glyphs and report the interpretation using oral and written communication.
- Use mathematical language to communicate effectively.

Materials/Resources/Printed Materials:

Material per individual—Day 1

- Worksheet 1 “Glyph Key”
- Worksheet 2 “Hershey Data Collection Table and Glyph Sheet”
- Calculator
- Worksheet 3 “Math Journal Prompt”

Teacher Materials—Day 1

- Transparency of Worksheet 2 "Hershey Data Collection Table and Glyph Sheet"
- Transparency Markers
- Hershey Milk Chocolate candy bar (several, if possible)
- Metric Ruler (Overhead metric ruler, if available)
- Calculator (Overhead calculator, if available)
- "Candy Bar Data Reference Sheet" (Teacher Resource #1)

Material per individual—Day 2

- Candy Bar (Refer to "Candy Bar Data Reference Sheet" for suggested candy bars.)
  Note: For a class of 30, it is suggested that you have at least five different candy bars to create diversity.
- Worksheet 1 "Glyph Key"
- Worksheet 4 "Candy Bar Data Collection Table and Glyph Sheet"
- Metric ruler
- Calculator
- Colored pencils or crayons

Teacher Materials—Day 2

- "Pay Day Glyph" transparency (Teacher Resource #2)
- Chart paper
- Markers

Material per individual—Day 3

- Completed Worksheet 4 "Candy Bar Data Collection Table and Glyph Sheet"
- Candy bar from Day 2
- Metric ruler
- Calculator
- Worksheet 5 "Interpretation and Critique"

Teacher Materials—Day 3

- "Glyph Construction Rubric" (Teacher Resource #3)
- "Interpretation of Peer's Glyph Rubric" (Teacher Resource #4)

Development/Procedures:

Day 1:

- The teacher explains to the students that over the next three days they will be collecting, organizing, displaying, and interpreting data about various candy bars.

- The teacher will inform the students that they will create glyphs that will be used to display their data.

- The teacher will quickly review the definition and components of a glyph with the class.

- Worksheet 1 "Glyph Key" and Worksheet 2 "Hershey Data Collection Table and Glyph Sheet" will be distributed and discussed.

- The teacher will display a Hershey Milk Chocolate candy bar and will tell the class that they will work together to collect the data and construct a glyph for this candy bar.

- The teacher will pass around the Hershey Milk Chocolate candy bar for the students to examine.
  Note: It would be conducive if several of these bars were passed around so each table or each small group of students had access to the candy bar. **Due to the fact that candy bar prices vary, the price of fifty-five cents has been used to create the "Glyph Key" and "Teacher Data Key." In computing cost per gram, fifty-five cents must be used as the cost of each candy bar.**

- The calculators will be passed out at this time.

- The teacher will guide the class in collecting, calculating, and recording the Hershey Milk Chocolate candy bar data.
  Note: At this point the teacher may need to teach or review how to compute volume and price per gram.

- The teacher will model the construction of the Hershey Milk Chocolate candy bar glyph using the data collection table and glyph key. The students will complete Worksheet 2 "Hershey Data Collection Table and Glyph Sheet."

- The students will make a math journal entry in response to one of the statements on Worksheet 3 "Math Journal Prompts."

Day 2:

- The materials for Day 2 will be distributed to students.

- The teacher will show the students the Pay Day glyph transparency.

- The class will orally interpret the glyph using Worksheet 1 "Glyph Key."

- Using student input, the teacher will model how to write a glyph interpretation. The teacher will write the interpretation on chart paper, transparency, or chalkboard.

- The students will work independently collecting and recording the data for their candy bar. The students will use this data and the glyph key to display the data in glyph form on Worksheet 4 "Candy Bar Data Collection Table and Glyph Sheet."

- Ask students to use masking tape to label their candy bars with their names, making sure the labels do not cover any pertinent information.

- Students will return the materials including the candy bars and Worksheet 4 "Candy Bar Data Collection Table and Glyph Sheet" for use in the next lesson.

Day 3:

- The materials for Day 3 will be distributed.
- Each student will be paired with another student who has a different candy bar.
- Each pair of students will exchange Worksheet 4 "Candy Bar Data Collection Table and Glyph Sheet."
- Explain format of Worksheet 5 with students and stress importance of correctly completing information at the top.
- Using the glyph key, each student will interpret in writing his partner's glyph on Worksheet 5 "Interpretation and Critique."
  Note: Assure students that they will have an opportunity to respond in writing to their partner's interpretation of the glyph.
- Upon completion of the written interpretation, the partners will return the glyphs with corresponding interpretation.
- Each student will silently read the interpretation of his/her glyph. The student will decide whether he/she agrees or disagrees with the interpretation and will support his/her position in writing on Worksheet 5 "Interpretation and Critique."
- The teacher will collect Worksheets 4 and 5 for assessment purposes.
- The materials are collected and the students get to eat their candy bars.

Evaluation:

Students can be evaluated based on the following criteria:
Note: Rubrics are attached.

- Group discussions of Day 1 and 2 — Check daily for individual understanding through questioning, peer responses, journal entries, and class summary of what they have learned.
- Worksheet 4 "Candy Bar Data Collection Table and Glyph Sheet" assessed using "Glyph Construction Rubric."
- Worksheet 5 "Interpretation and Critique" assessed using "Interpretation of Peer's Glyph Rubric."

Extension/Follow Up:

Math:

- Develop a survey and collect data on students' favorite candy bars. Present the data in a graphic display.
- Determine probability of picking a specific candy bar from a bag of different kinds and present findings. Note: A bag of Hershey Miniatures is suggested.
- Conduct comparative shopping and locate the best bargain.
- Create a logic puzzle on who prefers each brand of candy bar.

Social Studies:

- Research the history of chocolate.
- Tour a candy bar factory and generate a list of who might be affected if such a factory would be closed.

Science:

- Relate collected data to nutrition.
- Research and report on the cocoa bean plant.

Art/Music:

- Create a commercial and/or a song advertising a candy bar.
- Create a poster advertising a candy bar.

Writing:

- Write a mystery on who stole the candy bars.
- Write a friendly letter to the candy bar company of your choice telling them why you enjoy their product.

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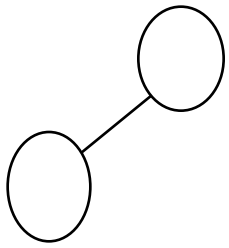
Worksheet 1 **Name: _____**
Page 1

Glyph Key

The candy bar's volume is represented by the width of body. (The body height for all glyphs will be 15 cm.)

29 - 41 cubic cm = 4 cm
42 - 54 cubic cm = 7 cm
55 - 67 cubic cm = 10 cm
68 -100 cubic cm = 13 cm

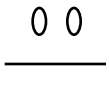
The candy bar's weight is represented by the number of barbells held.



35 - 42 grams = 1 barbell
43 - 50 grams = 2 barbells
51 - 58 grams = 3 barbells
59 - 65 grams = 4 barbells

The candy bar's price per gram is represented by facial expression.

.90¢ - 1.05¢ = 

1.06¢ - 1.20¢ = 

1.21¢ - 1.35¢ = 

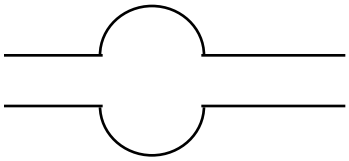
1.36¢ - 1.50¢ = 

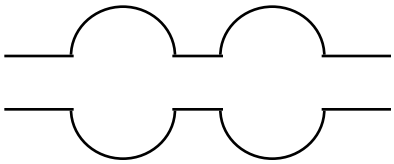
Worksheet 1 **Name: _____**
Page 2

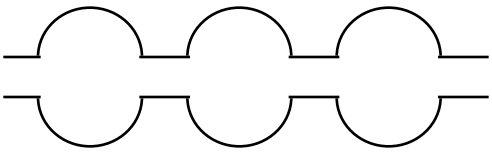
Glyph Key

The candy bar's total fat is represented by arm type.

4 - 7 grams= 

8 - 11 grams= 

12 - 15 grams= 

16 - 20 grams = 

Worksheet 2 **Name:** _____

Hershey Data Collection Table and Glyph Sheet

Name of Candy Bar	Weight (in grams)	total fat	price per gram	volume
Hershey Milk Chocolate				

Hershey Milk Chocolate Glyph

Worksheet 3 **Name:** _____

Math Journal Prompt

Respond to one of the following statements.

1. Explain how to find the volume of a candy bar.

2. Describe how you would compute the cost per gram of a candy bar.

Worksheet 4 **Name: _____**

Candy Bar Data Collection Table and Glyph Sheet

Name of Candy Bar	Weight (in grams)	total fat	price per gram	volume

_____ **Glyph**

Worksheet 5

Glyph made by _____
Glyph interpreted by _____

Interpretation of Glyph

_____

_____

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Critique of glyph interpretation

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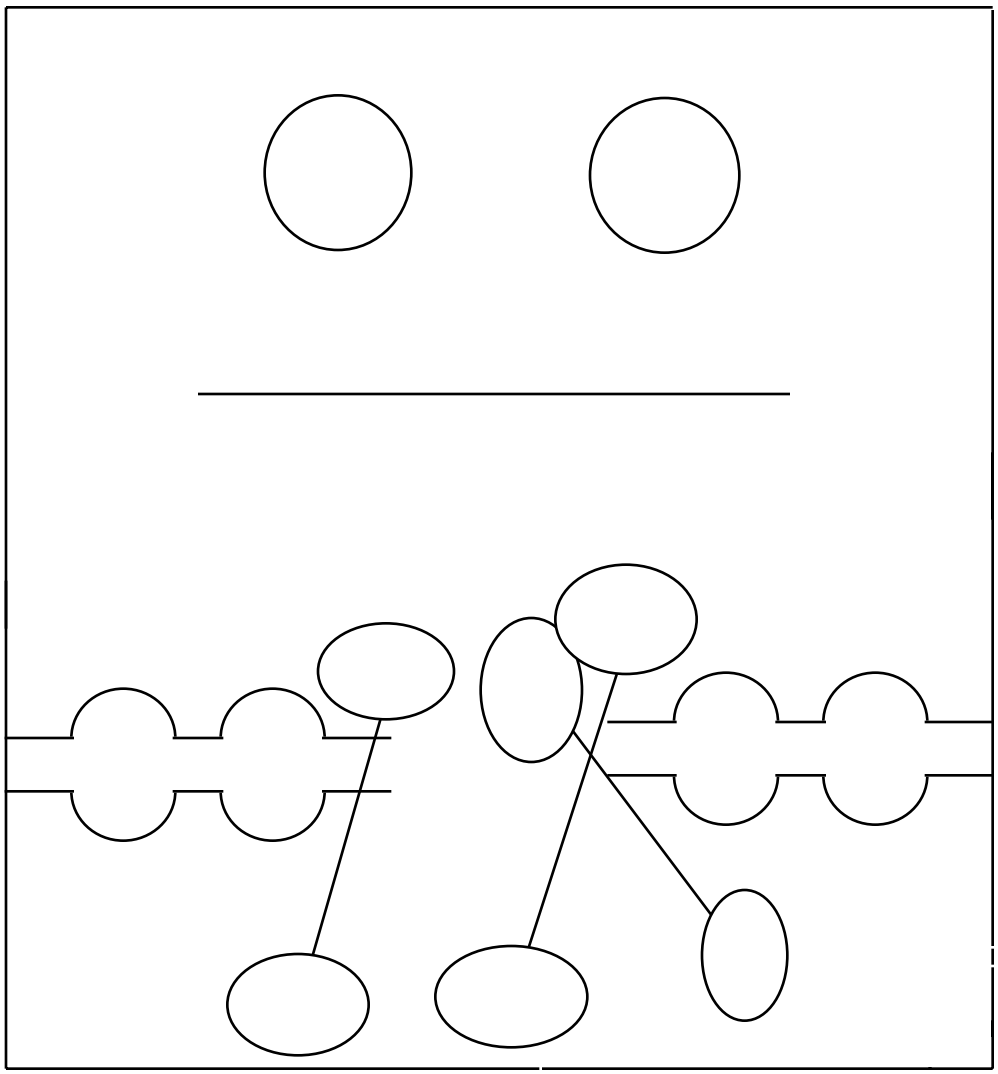
Candy Bar Data Reference Sheet

Teacher Data Key

Candy Bar	Wt. (grams)	Cost Per Gram	Total Fat	Volume
Hershey Almond	41 g	1.34¢	14 g	65 cm^3
Snickers	58.7 g	0.93¢	14 g	66 cm^3
Mars	49.9 g	1.10¢	13 g	60 cm^3
Crunch	43.9 g	1.25¢	12 g	70 cm^3
3 Musketeers	60.4 g	0.91¢	8 g	78 cm^3
Mr. Goodbar	49 g	1.12¢	18 g	65 cm^3
Clark	49.6 g	1.10¢	10 g	39 cm^3
Hershey Milk Chocolate	43 g	1.27¢	13 g	65 cm^3
Pay Day	52 g	1.05¢	12 g	98 cm^3**

** The volume of the Pay Day candy bar may vary due to the uneven surfaces and the variance in size of nuts. For that reason, we suggest using the Pay Day for demonstration and selecting only bars that are rectangular prisms and not cylindrical-shaped candy bars (Tootsie Roll, Pay Day, etc.).

Pay Day Glyph



Pay Day Glyph Transparency

Glyph Construction Rubric

3 points

- All data is accurate.
- Correct symbols are used.
- Glyph is neat and easily read.

2 points

- No more than 1 piece of inaccurate data was collected and/or recorded.
- No more than 1 incorrect symbol was used.
- Glyph is readable.

1 point

- Two or more pieces of inaccurate data were collected and/or recorded.
- Two or more incorrect symbols were used.
- Glyph is difficult to read.

0 points

- No attempt made.
- Glyph is unreadable.

Interpretation of Peer's Glyph Rubric

3 points

- Information presented is an accurate interpretation of symbols on glyph.
- Appropriate mathematical terms are used correctly.
- Information is presented with clarity.
- Information is strongly supported with detail.

2 points

- Information presented has no more than one (1) error in the interpretation of symbols on glyph.
- Mathematical terms are present, but used inappropriately and/or incorrectly.
- Some of the information presented is unclear.
- Information is adequately supported with detail.

1 point

- Information presented has more than one (1) error in the interpretation of symbols on glyph.
- No use of mathematical terms.
- Most of the information presented is unclear.
- Information lacks supportive details.

0 points

- No attempt made.